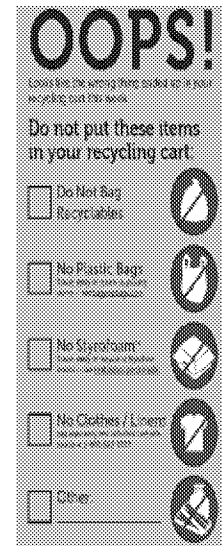
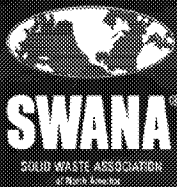


Contamination Declining

Contamination rates are declining in communities that are focusing educational or enforcement resources to residents

- District of Columbia DPW - 24% to 18%
- Rumpke/Fairfield – 22 to 12%
- San Antonio - 29% to 21%
- WM reports national contamination rate at their MRFs has declined from 24% to 18%
- Mass DEP Recycling IQ Kit reduced cart rejections in communities by 30 – 80%





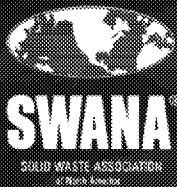
Contamination

We still have work to do on contamination...

SCENE & HEARD

**Republic Services Would Appreciate it if You'd
Stop Putting Live Ammo and Dead Animals in the
Recycling**

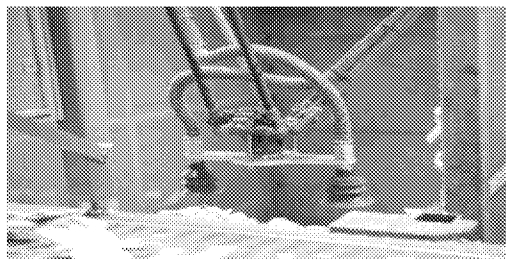
Posted By Sam Allard on Thu, May 23, 2019 at 10:54 am

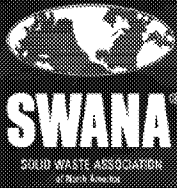


MRF Improvements

Recycling Facilities Need to be Updated

- **Upgrades to equipment**
 - Optical sorters, robots, AI, ballistic separators
- **More automation/fewer people**
- **More flexibility to adapt to changing material streams**
- **“MRF of the Future”**
 - WM/Chicago
 - Republic/Plano
 - J.P. Mascaro/Pa





Chemical Recycling

Increased interest in plastic-to-fuel and polymer level recycling. A recent Closed Loop Fund report identified 60 chemical recycling solutions

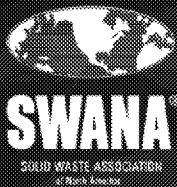
- **Dow/EnergyBag is most visible**
- **Marine Litter is major catalyst for investment by large companies**



Increasingly Optimistic

1. **U.S. & Chinese companies are investing in domestic processing capacity in the U.S.**
 - 20+ plants coming on-line in late 2019-2021 (mostly paper)
 - 3.5M tons OCC/mixed paper & 1M tons pulp





Increasingly Optimistic

- 2. MRFs are making investments**
- 3. Brands are setting new recycled content goals**
- 4. Renewed focus on contamination at all levels** -- contamination rates are declining
- 5. Increased cooperation and collaboration among recycling stakeholders**
- 6. Chemical Recycling coming on-line**